



# Armed Forces College of Medicine

## AFCM



# Pathology of Joint Diseases

# Lecture Plan



1. Part 1 (5 min) Introduction
2. Part 2 (35 min) Main lecture
3. Part 3 (5 min) Summary
4. Lecture Quiz (5 min)

# INTENDED LEARNING OBJECTIVES (ILO)



**By the end of this lecture the student will be able to**

- 1. List types and causes of arthritis.**
- 2. Discuss pathology of acute suppurative arthritis**
- 3. Mention the pathogenesis of rheumatoid arthritis**
- 4. Describe articular lesions of rheumatoid arthritis.**
- 5. List extra-articular lesions of rheumatoid arthritis.**
- 6. List causes of osteoarthritis**
- 7. Explain pathology of osteoarthritis.**
- 8. Mention etiology of gouty arthritis**



# Arthritis

## **Definition of arthritis:**

It is inflammation of the joints.

## **Types:**

### **Acute**

1. Suppurative
2. Traumatic
3. Rheumatic
4. Viral
5. Acute gouty arthritis

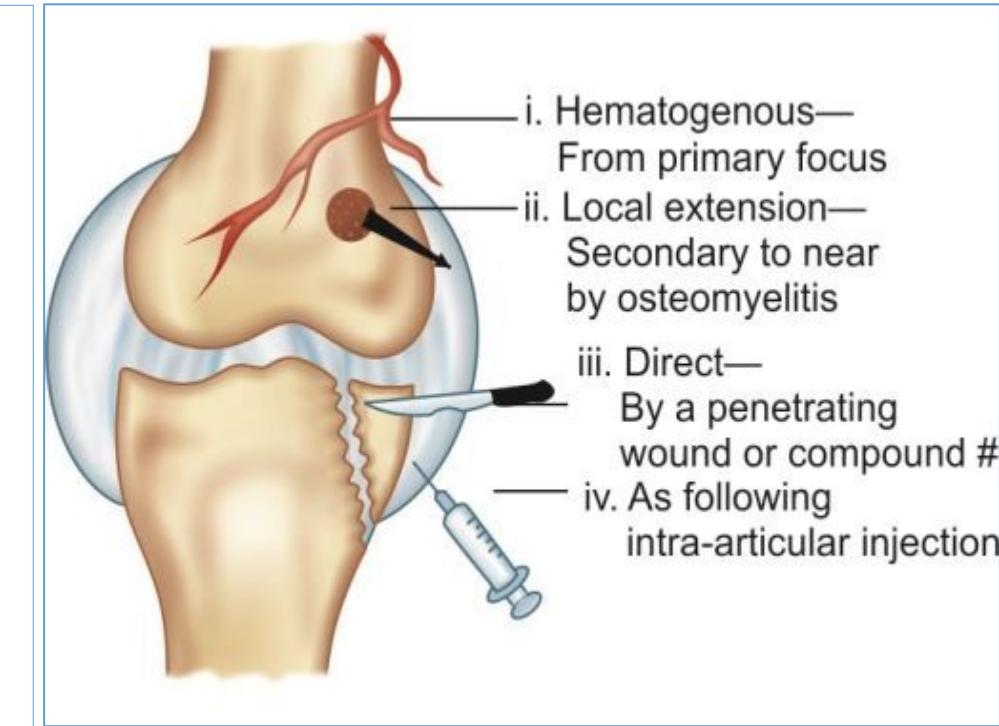
### **Chronic**

1. Osteoarthritis
2. Rheumatoid arthritis
3. Chronic gouty arthritis
4. Tuberculous arthritis  
*(general pathology)*
5. Syphilitic arthritis
6. Hemophilic arthritis

# Acute suppurative arthritis



- ❖ **Definition :** Acute inflammation that commonly involves a single large joint e.g: hip or knee
- ❖ **Organism:** staph. Aureus, less commonly strepyococci
- ❖ **Route of infection:**
  - Direct ↗ from osteomyelitis
  - Penetrating injuries
  - Blood borne



<https://jaypeedigital.com/book/9789350251096/chapter/ch4>



# Acute suppurative arthritis

## ❖ Clinically:

Joint is swollen (with pus), red, hot and tender with marked restriction of movement

## ❖ Pathology:

- Suppurative inflammation of joint space and the surrounding soft tissue
- Destruction of articular cartilage → healing by fibrosis → fibrous ankylosing





# Rheumatoid arthritis

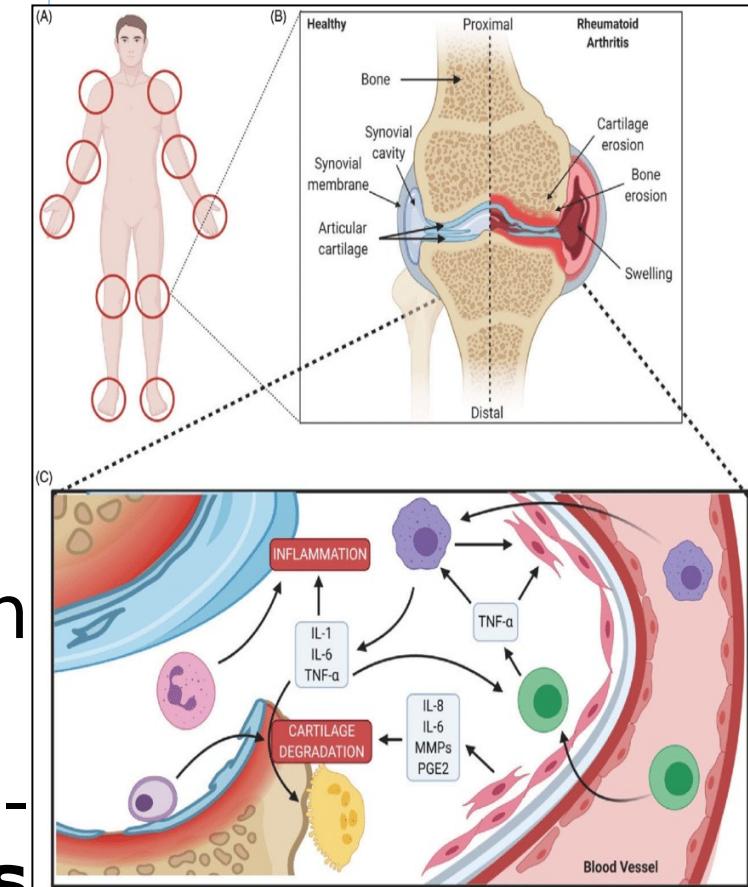
❖ **Autoimmune** collagen disease, more common in females between 30-50 years.

❖ **Pathology:**

- 1- Articular
- 2- Extraarticular

❖ **PATHOGENESIS:**

- An autoimmune mechanism of unknown stimulus
- Autoantibodies are liberated--> inflammatory reaction-----> **cytokines** as **TNF & interleukins** as well as **enzymes** as **proteases** ☐ **destruction of joint structures**



# Rheumatoid arthritis



## **PATHOLOGY:** **lesions**

- Polyarthritis
- Involving mainly small joints of hands and feet
- Symmetrical involvement
- The involved joints are swollen, painful and stiff

## **1- Articular (joint)**



[https://en.wikipedia.org/wiki/Rheumatoid\\_arthritis#/media/File:Rheumatoi...](https://en.wikipedia.org/wiki/Rheumatoid_arthritis#/media/File:Rheumatoi...)



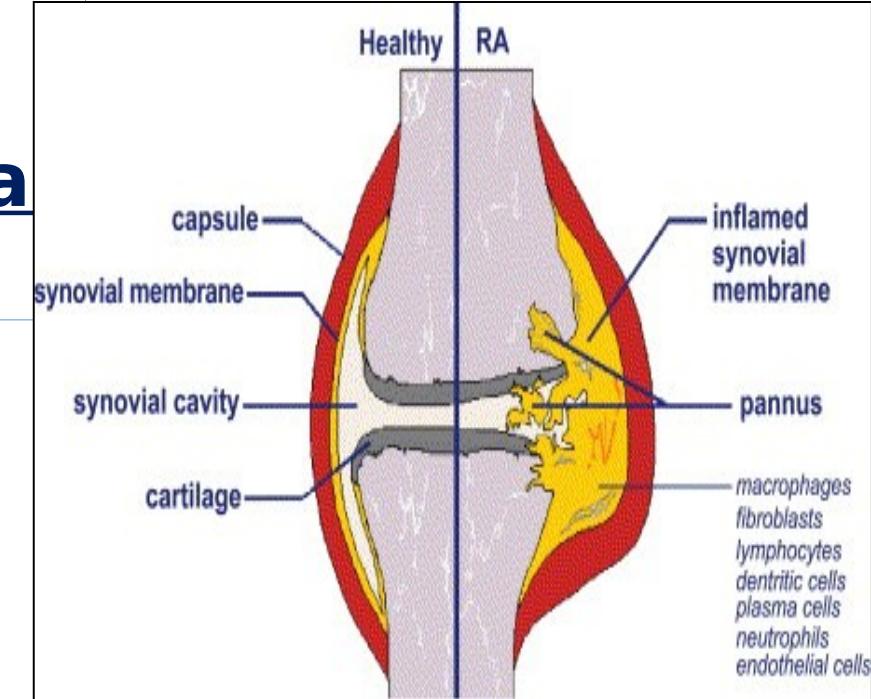
<https://www.docwirenews.com/home-page-editor-picks/what-aggravates-rheuma...>

# Rheumatoid arthritis

## **PATHOLOGY:** **(joint) lesions**

### **A. Chronic inflammation of the synovia membrane:**

#### **1- Articular**



<https://www.sciencedirect.com/science/article/abs/pii/S0009898104003>

# Rheumatoid arthritis

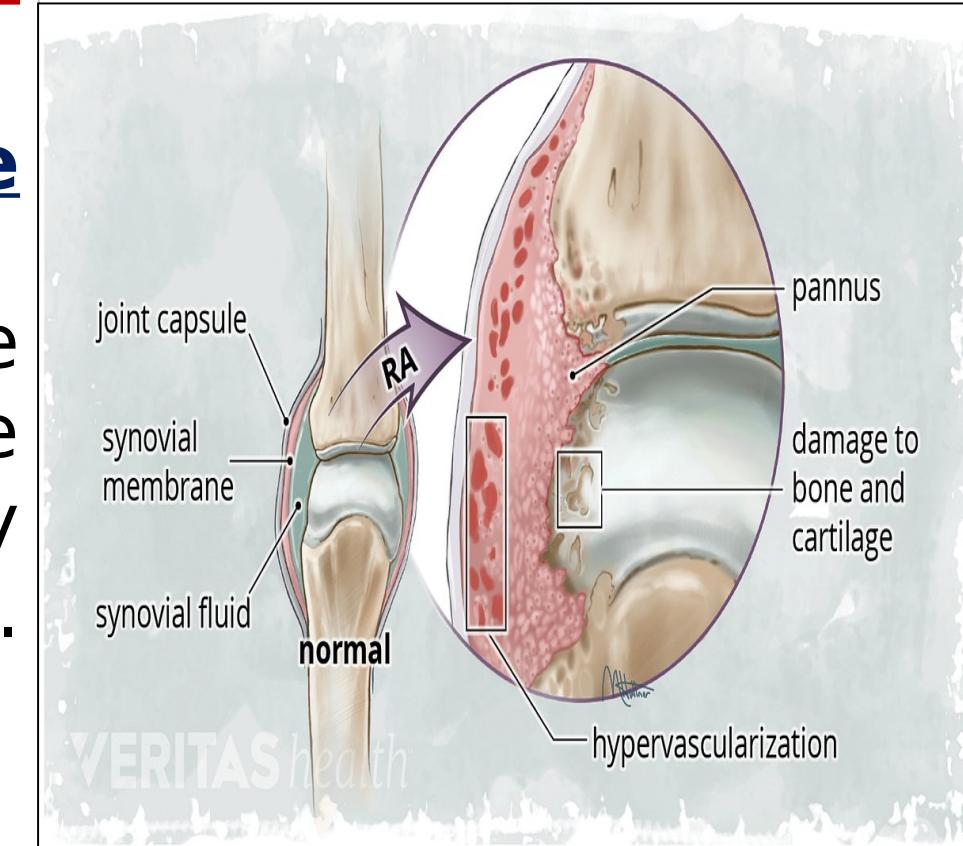
## PATHOLOGY: (joint) lesions

### B. Excessive granulation tissue formation

- Creeps under the articular cartilage within the eroded bone, and over the articular cartilage and may communicate on both surfaces.  
**(Pannus)**

### C. Articular cartilage is destroyed

- > healing by fibrosis--> **fibrous ankylosing** ---> **bony ankylosing** ---  
> the joint becomes **deformed**



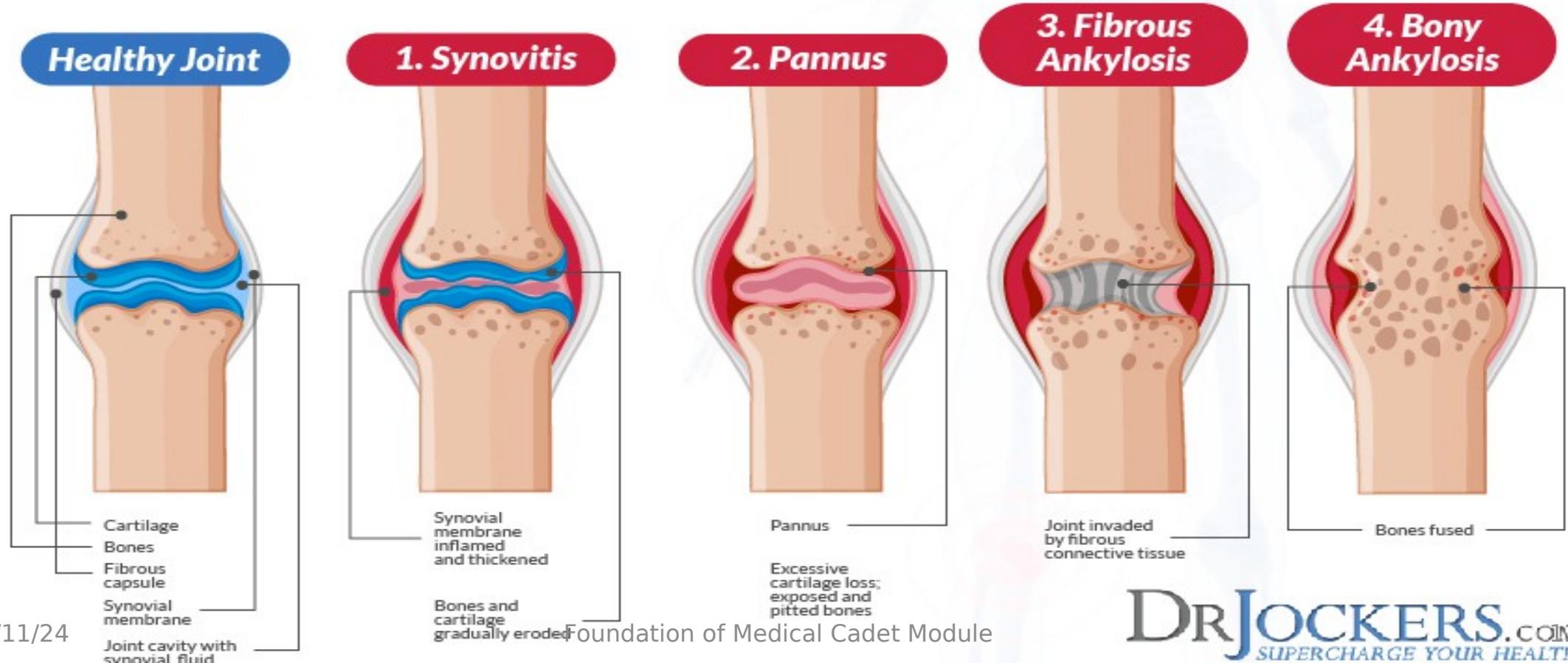


# Rheumatoid arthritis

IOLOGY:

## 1- Articular (joint) lesions

### Stages of Rheumatoid Arthritis



6/11/24

Foundation of Medical Cadet Module

<https://www.himaayush.com/blog/arthritistypes-of-arthritis/>

**DrJockers.com**  
SUPERCHARGE YOUR HEALTH

# RHEUMATOID ARTHRITIS



**PATHOLOGY:** *2- Extra-articular lesions*

## a) Rheumatoid nodules:

Mainly develop subcutaneously over bony prominences



<https://www.pcds.org.uk/clinical-guidance/rheumatoid-nodules>



# RHEUMATOID ARTHRITIS



## PATHOLOGY: lesions

### ***2- Extra-articular***

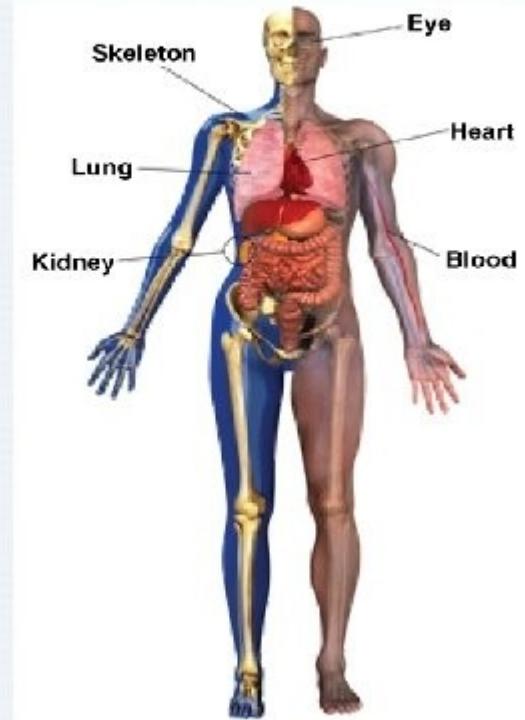
#### **b) Heart lesions:**

Rheumatoid nodules affecting the valves and pericardium.

#### **c) Vascular lesions:** Arteritis.

#### **d) Lymphoid hyperplasia and enlargement of lymph nodes and spleen.**

#### **e) Amyloidosis** may sometimes occur.



O'Dell JR. In: Goldman L, Ausiello D (eds). Cecil Medicine. 23rd ed. Saunders Elsevier

<https://slidetodoc.com/assessment-and-diagnosis-overview-treating-underlying-causes-of/>

# Osteoarthritis (OA)



- (OA) is a common **degenerative disease** characterized by primary abnormalities in the articular cartilage of **weight bearing joints** (knee, hip and spines are the most common sites).

## **Types:**

1. Primary (95%) affects old females  
> males (wear & tear joints)
2. Secondary (5%) affects any age

Osteoarthritis



<https://curearthritis.org/what-is-the-difference-between-osteoarthritis-and-other-forms-of-autoimmune-arthritis-such-as-rheumatoid-arthritis/>

# Osteoarthritis (OA)



**2. Secondary Osteoarthritis:** It can affect any age

**A. Chronic joint stress**

e.g. due to obesity and occupational strains.

**B. Abnormal joint mechanics** e.g.

- Defective nerve supply to a joint
- Congenital joint deformities
- Acquired joint deformities e.g post-traumatic

**C. Systemic disease (helping factors)** : as diabetes mellitus



*Deformity of both feet from collapse of the midfoot arch due to Charcot neuropathic arthropathy -in this case in a patient with alcoholic peripheral*

<https://www.amputee-coalition.org/resources/prosthetic-primer/>



healthy foot



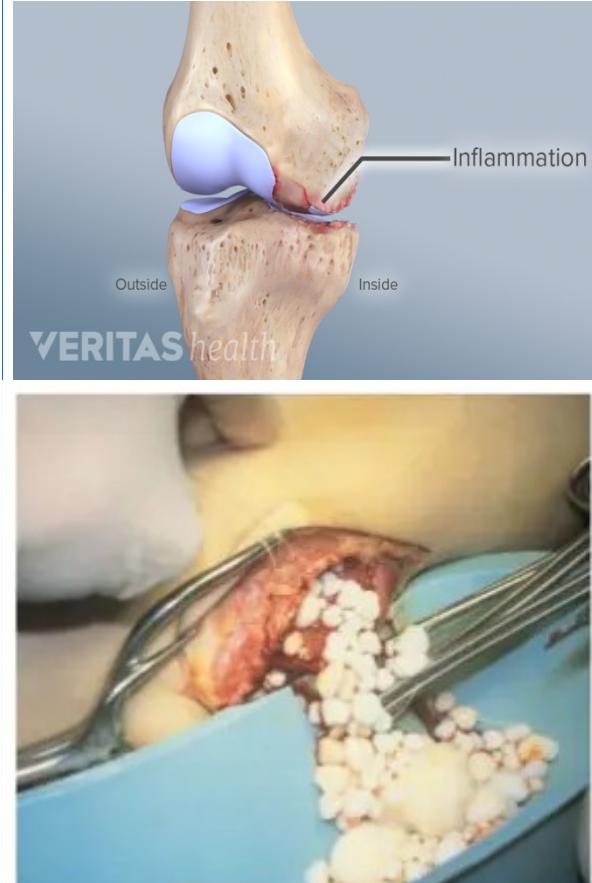
charcot foot

# Osteoarthritis (OA)



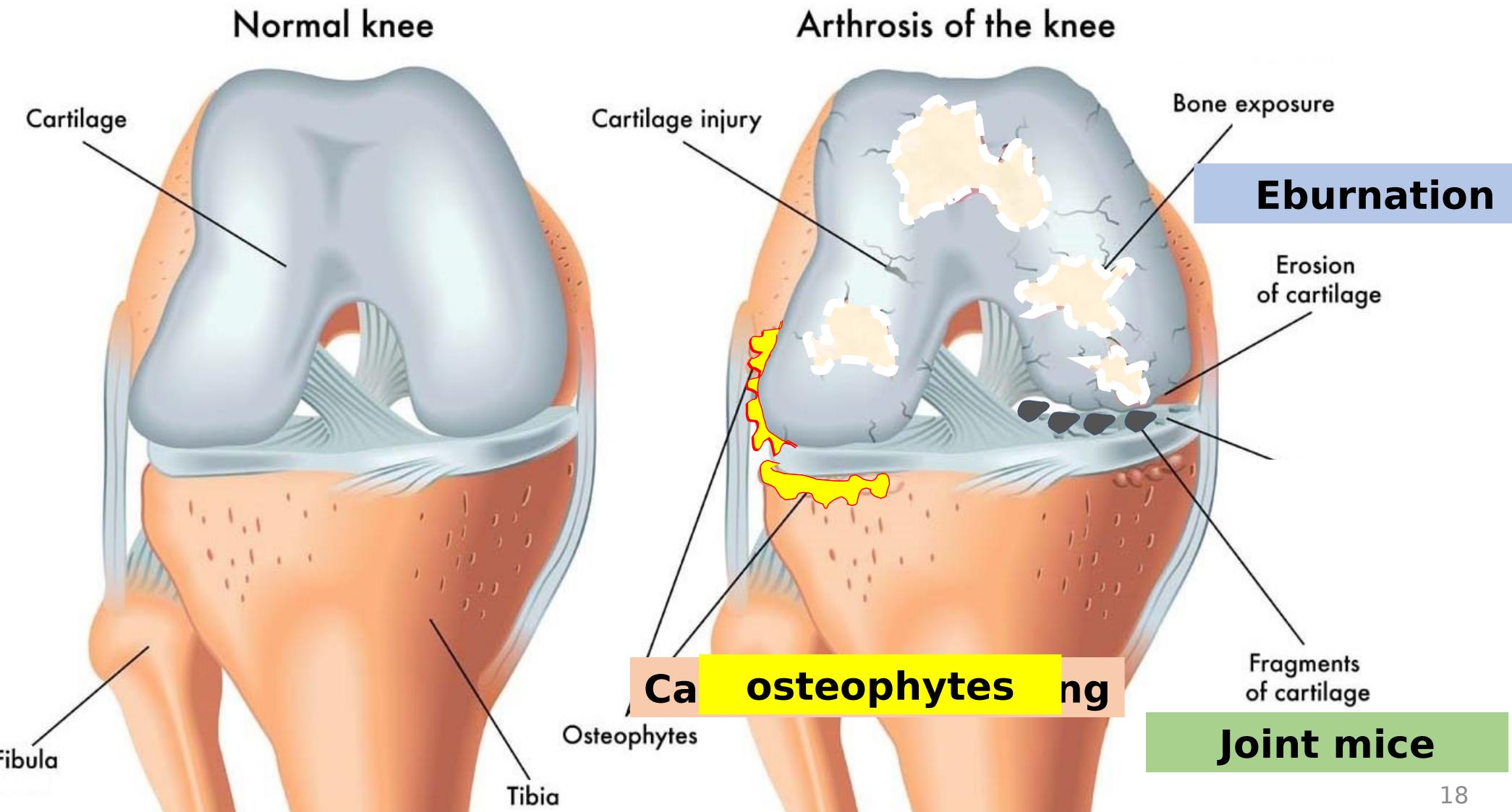
## 1. Articular cartilage & bone lesions:

- **Degeneration** and **softening** of articular cartilage then **disappears** and the underlying bone is exposed.
- Proliferation of the peripheral parts of cartilage occur ---> **cartilaginous lipping** ---> Ossification of these lipping leads to **bony projections (osteophytes)**
- Separated portions of degenerated cartilage may float freely in the joint (**joint mice**)
- The underlying bone undergoes **progressive eburnation**.





# Osteoarthritis (OA)





# Gouty arthritis

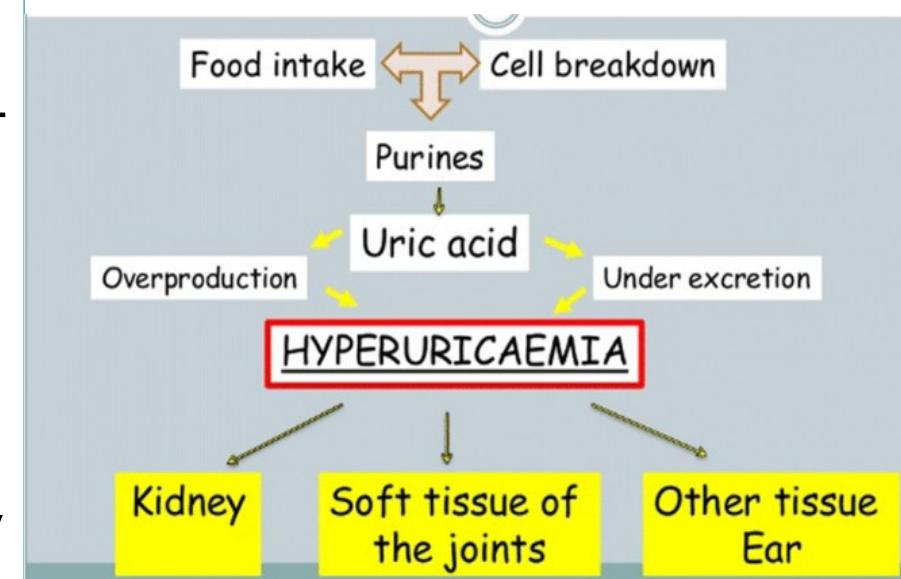
## Etiology:

Disturbance in **purine metabolism**

---> increase in serum uric acid --->  
deposition of sodium urate crystals in  
tissues

1. **Primary gout**: (known or unknown  
enzyme defect) hereditary  
predisposition

2. **Secondary gout**: Due to excess  
nucleoprotein destruction as in  
chronic myeloid leukaemia



[https://www.researchgate.net/figure/Flow-chart-of-GOUT-pathophysiology\\_](https://www.researchgate.net/figure/Flow-chart-of-GOUT-pathophysiology_)

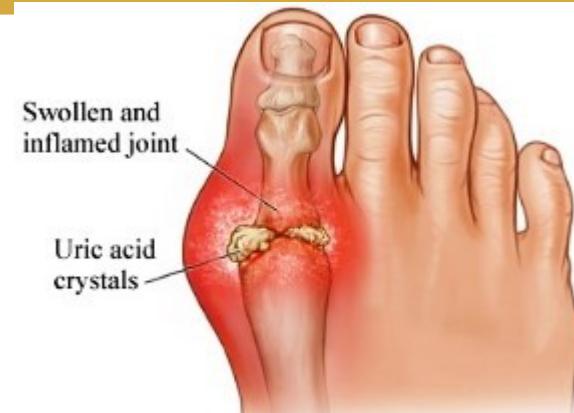
# Gouty arthritis

## Pathology:

1. Increase serum uric acid  
(hyperuricaemia)
2. Monosodium urate crystals  
(MSU)deposition --->

a. **Acute arthritis:** particularly the big toe ---> severely inflamed with dense neutrophilic infiltration

b. **Chronic tophaceous arthritis:** excess deposition of MSU crystals in cartilage and synovium ---> chronic inflammation and fibrosis ---> joint ankylosing



<https://www.optimaphysio.com/blog/evidence-based-physiotherapy-for-gout>





# Gouty arthritis

## C.Tophi:

❖ **Gross**: Small nodular lesions with chalky white color

❖ **Structure**: Aggregates of urate crystals

### ❖ **Microscopic**:

Amorphous material surrounded by chronic granulomatous reaction rich in giant cells (foreign body granuloma)

❖ **Sites**: appear in

**1.Joint structures**

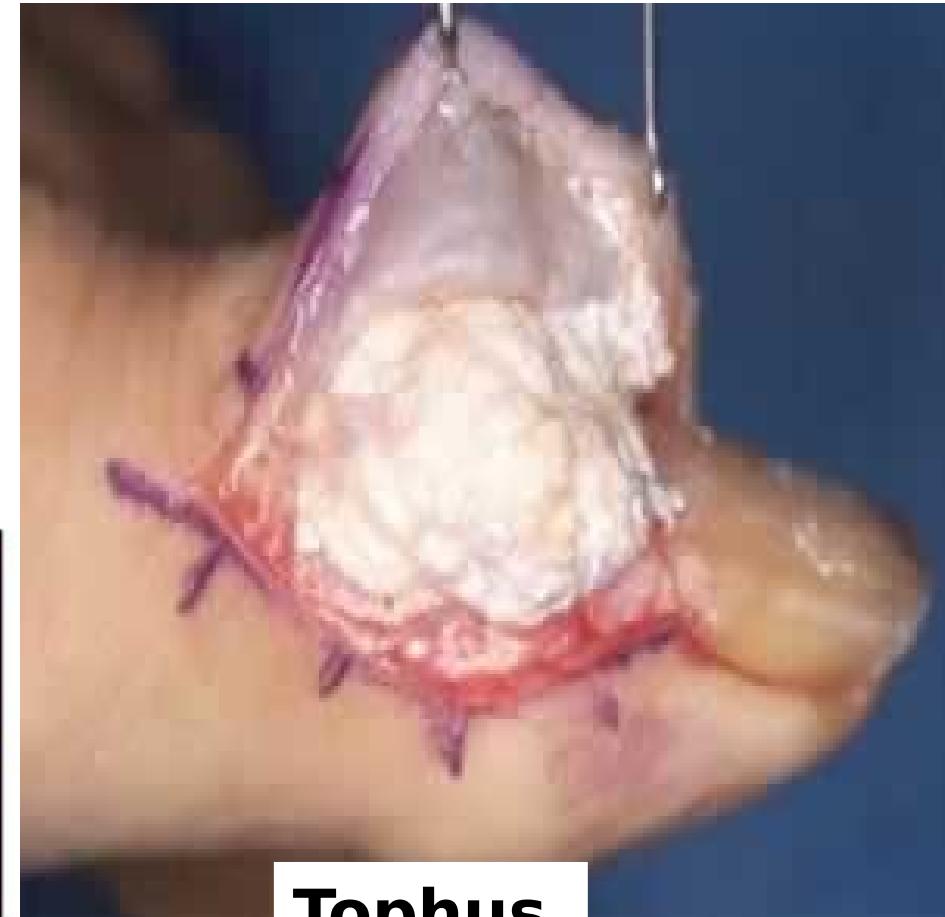
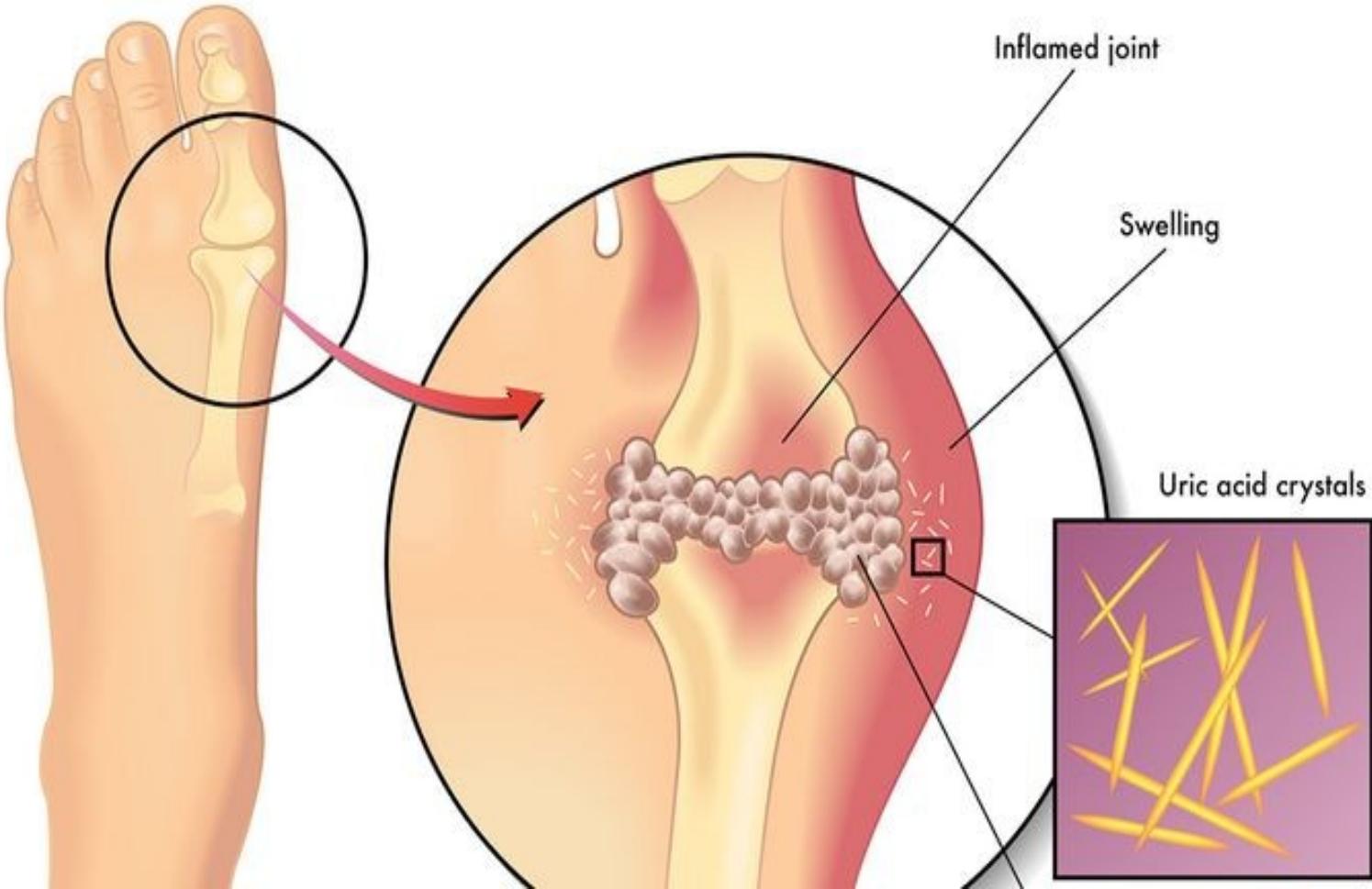
**2.Cartilage of nose and ear pinna** --->

ulceration of overlying skin

**3.Subcutaneous (eyelids)**  ulceration of overlying skin



# Gouty arthritis



**Tophus**



# Gouty arthritis



# Gouty arthritis

## D. Gouty nephropathy:

- ❖ Tophi in the interstitial tissue of the kidney
- ❖ Uric acid/ urate stones in the renal pelvis and calyces
- ❖ Renal failure may occur



[https://www.wikidoc.org/index.php/File:Gout\\_0033.jpg](https://www.wikidoc.org/index.php/File:Gout_0033.jpg)



# Quiz

**Rheumatoid arthritis is characterized by all of the following, Except:**

- a. Affection of small joints
- b. Fibrinoid type necrosis of the synovium
- c. Creeping granulation tissue formation in the joint space
- d. Small nodules over the ear pinna and eyelids with ulcerated covering skin
- e. Subcutaneous nodules over the elbow joint



# Quiz

**A 60 years old, obese, female patient, complaining of bilateral knee pains that increases with walking, started few years ago in a progressive fashion. What do you expect to find in her knee joint:**

- A. A creeping granulation tissue
- B. A chalky white nodular lesions
- C. Cartilagenous lippings that later ossify
- D. Synovial membrane necrosis
- E. Pus



## SUGGESTED TEXTBOOKS

1. Robbins basic pathology, ninth Edition
2. Kaplan step 1 pathology lecture notes 2017 (P.78-98)